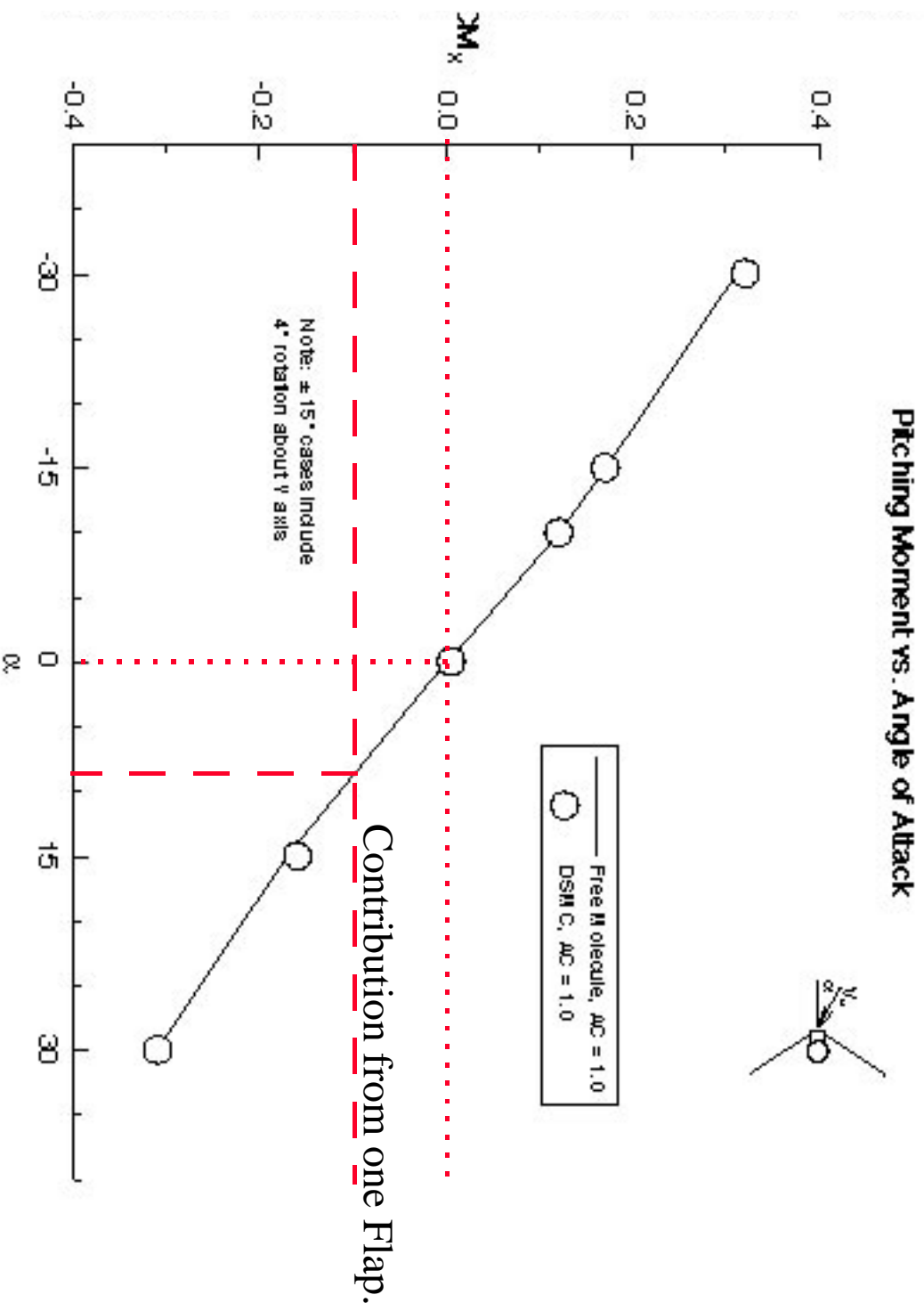


Aerodynamic Moments with one “Missing” Flap from Russell Shane (GWU)

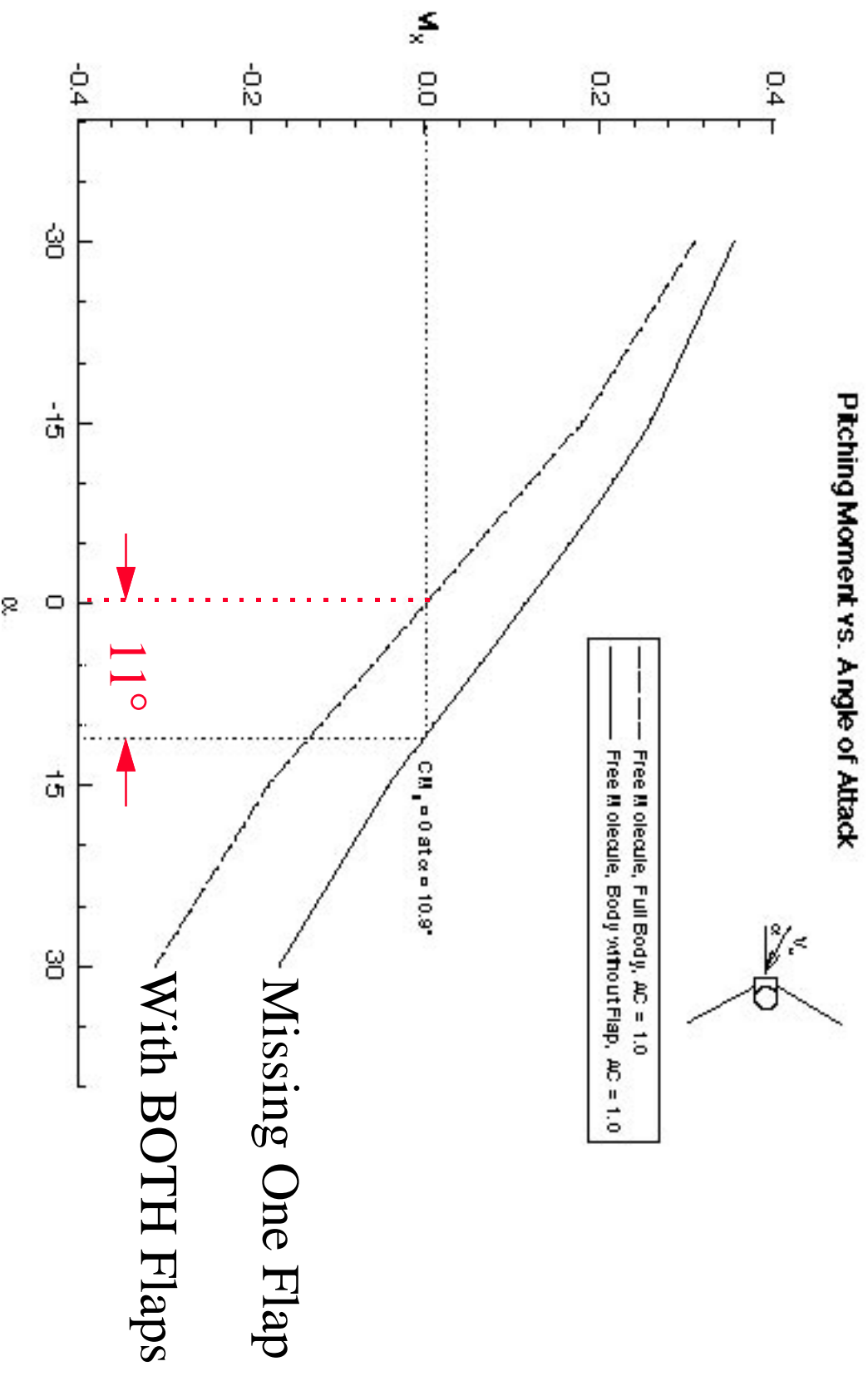
Dr.  an

July 12, 1996

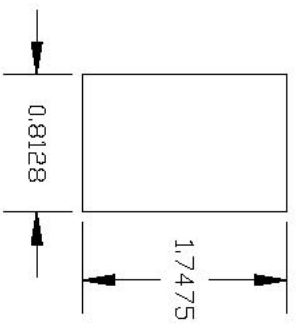
Nominal Moments about X-axis with Both Flaps



FREEMAC: WITH and WITHOUT FLAP

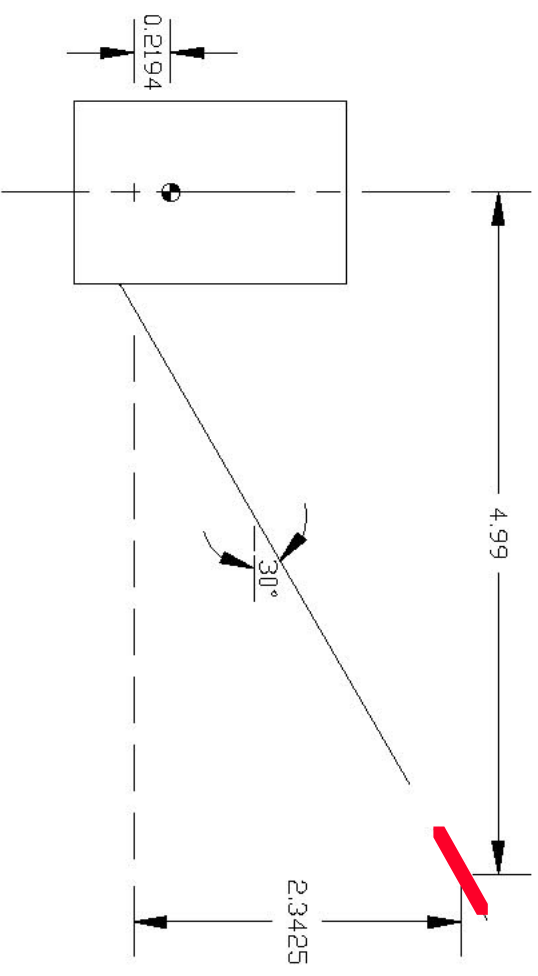


Moment Contribution for a Single Flap



$$\text{AREA} = 1.414 \text{ m}^2$$

FLAP, TOP VIEW



BUS, SOLAR PANEL, AND FLAP

- Notes:
1. Drawing not to scale.
 2. All units in meters unless otherwise noted.

CONCLUSIONS

- Aerodynamic Null is Offset by 11° for one “Missing” Flap.
- Aerodynamic Null is still Within the 15° Deadband.
 - Steady State Propellant might be “Reasonable”
 - Propellant during the Transient after flap buckles ... TBD.
- Note: AACS analysis for “Permanently Destroyed Flap”
 - Uses 12° Shift in the Aerodynamic Null.
 - Suggests that the Propellant Consumption \approx Double.
 - Can use the “Offset Quaternion” to reduce Propellant to Nominal.